1-18. (Cancelled)

19. (New) A resonant nanotube structure responsive to electromagnetic energy, said nanotube structure comprising:

a substrate; and

an ordered array of resonant nanotubes arranged on said substrate.

20.(New) The resonant nanotube structure responsive to electromagnetic energy as recited in claim 19, including;

an array of catalytic nanoparticles of a diameter arranged on said substrate from which said nanotubes are grown.

21. (New) The resonant nanotube structure responsive to electromagnetic energy as recited in claim 20, wherein said nanotubes on said substrate have resonance controlled by a physical dimension of said nanotubes on said substrate.

22. (New) The resonant nanotube structure responsive to electromagnetic energy as recited in claim 21, wherein said physical dimension of at least one of said nanotubes comprises a length of at least one of said nanotubes on said substrate.

23. (New) The resonant nanotube structure responsive to electromagnetic energy as recited in claim 21, wherein said physical dimension of at least one of said nanotubes comprises a diameter of at least one of said nanotubes on said substrate.

24. (New) The resonant nanotube structure responsive to electromagnetic energy as recited in claim 23, wherein said diameter of said at least one nanotube corresponds to said diameter of said catalyst on said substrate.

25. (New) The resonant nanotube structure responsive to electromagnetic energy as recited in claim 20, wherein said nanoparticle comprises a metal.

26. (New) The resonant nanotube structure responsive to electromagnetic energy as recited in claim 20, wherein said nanoparticle comprises a metal oxide.

27. (New) The resonant nanotube structure responsive to electromagnetic energy as recited in claim 20, wherein said nanoparticle comprises a growth seed.

28. (New) A nanotube gap device for detecting electromagnetic energy applied thereto, comprising:

a substrate having at least one electrode; and

a periodically ordered array of carbon nanotube elements arranged perpendicular to said substrate, wherein said array of nanotube elements are arranged at a fixed position relative to one another to define a gap between adjacent elements, said gap corresponding to an electromagnetic wavelength.

29. (New) The nanotube gap device for detecting electromagnetic energy as recited in claim 28, wherein said nanotube elements are arranged on an array of growth nanoparticles arranged on said substrate.

30. (New) The nanotube gap device as recited in claim 28, wherein said array of said nanotube elements are of varying lengths on said substrate.

31. (New) The nanotube gap device as recited in claim 28, wherein said nanotube elements are arranged opposed to one another on said substrate.

32. (New) An ordered array of electromagnetic responsive nanotubes, comprising:

a substrate;

a metal catalyst arranged in an ordered array on said substrate, wherein said nanotubes are arranged to extend away from said substrate, said nanotubes having a high length to diameter to ratio.

33. (New) The ordered array of electromagnetic responsive nanotubes as recited in claim 32, wherein said nanotube is a carbon nanotube.

34. (New) The ordered array of electromagnetic responsive nanotubes as recited in claim 32, wherein said ordered array of nanotubes is periodic.

35. (New) The ordered array of electromagnetic responsive nanotubes as recited in claim 32, wherein said ordered array of nanotubes is arranged according to a particular wavelength of light.

36. (New) The ordered array of electromagnetic responsive nanotubes as recited in claim 32, wherein said metal catalyst is comprised of iron.

37. (New) A nanotube bandgap device having a substrate with an ordered array of nanotubes thereon, said nanotubes having a predetermined position on said substrate, said nanotubes having a predetermined dimension.

38. (New) The nanotube band gap device having a substrate with an ordered array of nanotubes thereon as recited in claim 37, wherein said nanotubes are responsive to electromagnetic energy.

39. (New) The nanotube band gap device having a substrate with an ordered array of nanotubes thereon as recited in claim 37, wherein said band gap device is responsive to lightwaves.

40. (New) The nanotube band gap device having a substrate with an ordered array of nanotubes thereon as recited in claim 37, wherein said band gap device is an energy detector.

41. (New) The nanotube band gap device having a substrate with an ordered array of nanotubes thereon as recited in claim 37, wherein said nanotubes on said nanotube band gap device are resonant to electromagnetic energy.

42. (New) The nanotube band gap device having a substrate with an ordered array of nanotubes thereon as recited in claim 41, wherein said electromagnetic energy comprises light of a particular wavelength.

43. (New) The nanotube band gap device having a substrate with an ordered array of nanotubes thereon, as recited in claim 37, wherein said ordered array of nanotubes are arranged to correspond to light of particular wavelengths.